CHILD MONITORING SYSTEM (PARENT)

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ABSTRACT

Bluetooth technology allowed multiple devices to communicate with each other or one device could control and manage the other device wirelessly. The Child Monitoring System (Parent) is one of alarm system which is developed using Bluetooth technology to monitor child in a certain area which is about 20 meters radius from the parent. The system is developed due to many cases of missing kids that happen nowadays in our country. To develop the system, there are several things needed to be learned. They are about PIC microcontroller, Bluetooth module data transmission and reception and also the existence system proposed by the other researchers. The important things to do during developing the system are assembly of the hardware which contain Bluetooth module as the main component for data transmission and reception while liquid crystal display (LCD) and buzzer as the indicator for the status of the child. The PIC microcontroller is acted as a controller that is reprogrammable and got the most important features to communicate two Bluetooth which is Universal Asynchronous Receiver Transmitter (UART). The software used is Microcode Studio to write and compile the PICBASIC programming language. This system could assist the parent in keeping an eye for their child whenever needed without the need of any licence.

ABSTRAK

Teknologi Bluetooth membenarkan pelbagai alat berkomunikasi antara satu sama lain atau satu alat menjadi pangawal dan pengurus alat-alat lain tanpa menggunakan sebarang wayar. Sistem Pengawasan Kanak-Kanak (Ibu Bapa) adalah satu sistem penggera yang dihasil menggunakan teknologi Bluetooth untuk memerhati anak-anak dalam lingkungan 20 meter daripada ibu bapa. Sistem ini dihasilkan kerana kes kehilangan kanak-kanak di negara ini semakin meningkat. Bagi menghasilkan sistem ini, beberapa perkara perlu dipelajari antaranya mengenai pengawalmikro PIC, cara penghantaran dan penerimaan data oleh modul Bluetooth dan sistem yang telah ada yang telah diusulkan oleh pengkaji-pengkaji lain sebelum ini. Perkara penting yang perlu dilakukan semasa penghasilan sistem ini ialah menggabungkan perkakas yang terdiri daripada modul Bluetooth sebagai komponen utama yang menghantar dan menerima data sementara paparan kristal cecair (LCD) dan penggera sebagai penunjuk tentang status kanak-kanak. Pengawalmikro PIC bertindak sebagai pengawal yang boleh diprogram semula dan mempunyai keistimewaan yang penting untuk dua Bluetooth berkomunikasi iaitu Universal Asynchronous Receiver Transmitter (UART). Perisian Microcode Studio digunakan untuk menulis dan menukar bahasa program PICBASIC kepada bahasa mesin. Sistem ini boleh membantu ibu bapa untuk mengawasi anak-anak apabila diperlukan tanpa memerlukan sebarang lesen.

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LIST OF SYMBOLS

bps	Bit Per Second
F	Farad
G	Giga
Hz	Hertz
M	Mega
p	Piko
V	Volts
VDC	Volts Direct Current

LIST OF ABBREVIATIONS

A/D	Analog to Digital
AT	Attention
BASIC	Beginners All Purpose Symbolic Instruction Code
BRG	Baud Rate Generator
CD	Compact Disc
CODEC	Coder Decoder
CRT	C Run Time
CTS	Clear To Send
D/A	Digital to Analog
EEPROM	Electrically Erasable Programmable Read-Only Memory
FOSC	Frequency Oscillator
GPIO	General Purpose Input Output
GPS	Global Positioning System
HCI	Host Controller Interface
I/O	Input Output
IrDA	Infrared Data Association
ISM	Industrial Scientific Medical
LCD	Liquid Crystal Display
OEM	Object Exchange Model
PDA	Personal Digital Assistant
PIC	Peripheral Interface Controller
RAM	Random Access Memory
RFID	Radio Frequency Identification
RTS	Request To Send
RxD	Receive Data
SCI	Serial Communication Interface

LIST OF ABBREVIATIONS

SPP	Serial Port Profile
TxD	Transmit Data
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
USART	Universal Synchronous Asynchronous Receiver Transmitter

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Background

The Child Monitoring System is a system which is developed using Bluetooth technology to monitor child in a certain area. The system is separated into two parts. This thesis will concentrate more on parent's part while the thesis on child's part will be concentrated by other person. Parents have the master device while the child has the slave device. The master device is sending and receiving data through Bluetooth module by using some command which is programmed into PIC microcontroller. The device has liquid crystal display (LCD) and buzzer in order to alarm parents about their child who probably out of Bluetooth range or the child is drop the slave device or can be both of the causes.

1.2 Introduction to the Project

The system has two main separated parts which are the parents' part (master device) and the child's part (slave part). The master device will send out a continuous signal to slave device. The slave device will receive the signal and remains silent but if the signal did not reach, the child will be alerted. In the other hand, the slave device will also send out signal to the master device so the master device will receive the signal and remains silent but if the signal did not reach, parents will be alerted and if the child is no longer wearing the device, the master device will produce some sort of information to notify the parents about that.

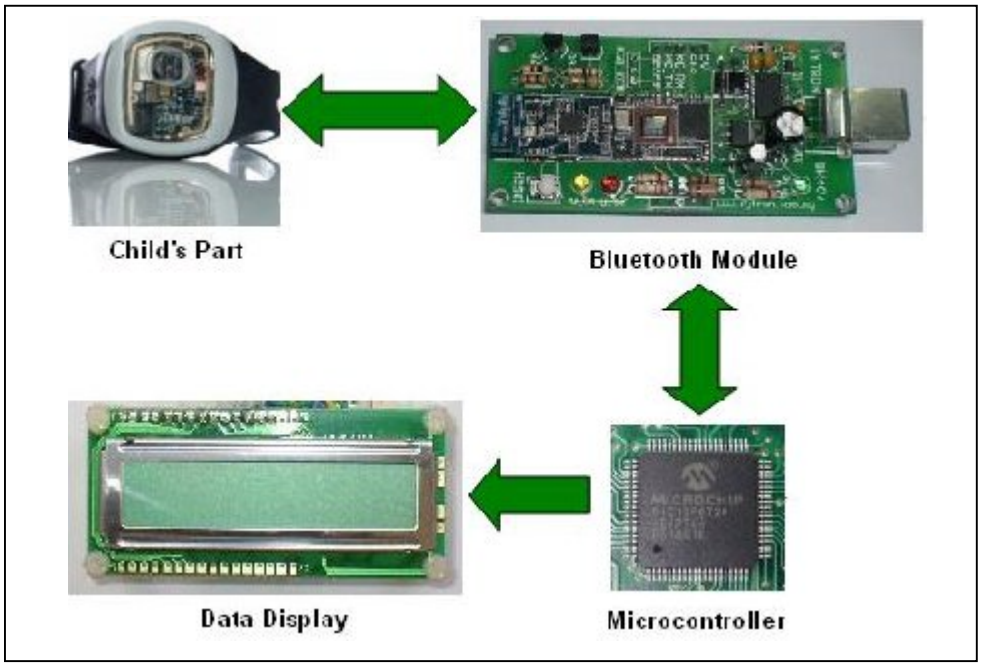

Figure 1.1 Block diagram for Parent's Part

In this project, master device used PIC Microcontroller to interface with the Bluetooth module. The program for it has been written using PICBASIC language. Microcode Studio is used to write and compile the program while PICkit 2 v2.40 programmer is used to program the PIC16F877.

1.3 Problem Statement

Nowadays, there are many cases of missing kids in the whole world. Due to United States Justice Department reports,

- ***797,500*** *children (younger than 18) were reported missing in a one-year period of time studied resulting in an average of 2,185 children being reported missing each day.*
- ***203,900*** *children were the victims of family abductions.*
- ***58,200*** *children were the victims of non-family abductions.*
- ***115*** *children were the victims of "stereotypical" kidnapping. (These crimes involve someone the child does not know or someone of slight acquaintance, who holds the child overnight, transports the child 50 miles or more, kills the child, demands ransom, or intends to keep the child permanently.)*

(National Incidence Studies of Missing Abducted Runaway, and Thrownaway Children, NISMART, October 2002)

It always happens in the playground, shopping complex and other public area which have so many people around. It will be worst case if the kid is missing when the parents are there but doing some other things at the moment. Parents are unable to monitor all their children especially when they have more than one child in crowded and wide area simultaneously. Other, parents' line of sight is limited.

1.4 Objectives

There are two objectives for this project.

1.4.1 To design and program the parent's part of the system to monitor child in the specific range of area by using Bluetooth technology

The Bluetooth technology has some specific range for its coverage normally measured in meter of its radius. It also has some protocols and steps to allow this Bluetooth work smoothly. This project is done by designing the circuit and programming the controller so that the parents would know the status of their child whether their child is still in the range and wearing the slave device or the child just step out of the range and dropping the slave device.

1.4.2 To program the microcontroller to function as desired

The microcontroller used in this system is PIC microcontroller. The program is downloaded and other devices are integrated with the PIC microcontroller.

1.5 Scope of Project

This Child Monitoring System which is specifically for the parent's part has four scopes.

1.5.1 Develop the system only for the parent's part

The master device has to search and initiate connection with the slave device by creating the SPP connection. SPP is used for host to communicate with Bluetooth module and its understanding language is AT command.

1.5.2 Develop the power module to supply 5V to the PIC and Bluetooth module

The main components such as PIC microcontroller, SKKCA Bluetooth module and LCD need only 5VDC power supply to function correctly. If the supply is over than 5VDC, they could damage.

1.5.3 Develop the PIC module that contains some components such as LCD and buzzer to indicate the status of the child

The alarm in this system contains LCD and buzzer to indicate the status of the slave device. There are three conditions set which only two of them will trigger the alarm. They are when the slave device is not attached to the child but it is in range and another one is the slave device is out of range. The one condition where the slave device will remains silent is when the slave device is attach to the child and at the same time is in Bluetooth range.

1.5.4 Develop programming for the system to function as desired

The programming is developed and burned into PIC microcontroller to do the data transmission serially and to do other jobs such as trigger the alarm. The Bluetooth also need a specific program that must be written into PIC microcontroller to be able to communicate with another Bluetooth.

1.6 Thesis Overview

This Child Monitoring System (Parent) final thesis is a combination of 6 chapters that contains and elaborates specific topics such as the Introduction, Literature Review, Methodology, Architecture, Result and Analysis, Conclusion and Further Development that can be applied in this project.

Chapter 1: basically about the introduction of this project.

Chapter 2: describe about the literature review for the development of the Child Monitoring System (Parent)

Chapter 3: discuss on the full methodology of this project.

Chapter 4: discuss about the architecture of the project that consist the hardware design and the software implementation.

Chapter 5: discuss all the results obtained and the limitation of the project. All discussions are concentrating on the result and performance of the Child Monitoring System (Parent).

Chapter 6: discuss the conclusion and further development of the project.

CHAPTER 2

LITERATURE REVIEW

This chapter reviews about the study that have been done before developed the Child Monitoring System. Some of them are about the systems that are look alike this Child Monitoring System. Other, they are the study about the main components used.

2.1 Personal Monitoring System

From the article published on January 08, 2008 by Ong Dee Nai, the Personal Monitoring System is a proposed system to assists parents in keeping an eye on their children while shopping. The system consist two separated parts which are master monitoring device and one or more slave devices. Both parts are Bluetooth-capable device. Master device could be either stand-alone or built into mobile phone carried by parents and slave device could be attached to a child. The both devices will communicate continuously and remain silent. Whenever one or more slave devices are found out of predetermined Bluetooth range, the master device will emit some notification like audible sound. The slave device could also be designed to emit an audible alert to assist the parent in locating one or more of the children.